

# Classification of Human Upper Respiratory Tract Tumors

by Dennis K. Heffner\*

**An outline of human upper respiratory tumors is presented, based on the World Health Organization's classification of such tumors. The discussion and illustrations are devoted mainly to the nasal passages, and emphasis is placed on lesions that are potentially confusing because of problems of terminology or unusual histologic features.**

## Introduction

Some types of tumors can occur in almost any location in the upper respiratory tract (URT), while others are more limited in their specific areas of occurrence. Thus it is potentially useful to divide the classification of URT tumors into those affecting various anatomic subregions. Regarding the nasal passages, it is of some importance to distinguish between the nasal cavity proper and the nasopharynx (epipharynx) in the human, since some of the neoplasms found in these two locations have relatively specific characteristics depending upon which area is the site of origin. Distinctions between these two regions often are not given proper attention by many human pathologists.

Many animals have only a meager region that would correspond to the human nasopharynx (1), thus distinction from a relatively large nasal cavity may not be important in the pathology of such an animal. However, for purposes of comparative pathology it is important to know that the nasopharynx in man deserves its own place in the classification of tumors (2).

The following discussion of the histologic features of human URT tumors will be based on a slightly modified version (presented at the end of the article) of the classification of these tumors developed by the World Health Organization (3).

## Tumors of the Nasal Cavity and Paranasal Sinuses

### Benign Epithelial Tumors

Papillomas arising from the sinonasal epithelium are an important group of tumors. Although benign, they

have a tendency for recurrence and can become large and extensive. The stroma of these tumors often resembles that of common inflammatory nasal polyps, for which they are sometimes histologically misdiagnosed.

The characteristic features that enable microscopic diagnosis include the proliferated patterns of the thickened, neoplastic surface epithelium. Papillomas of the nasal septum grow with a generally exophytic (or classically papillomatous) architecture (Plate 1), while those of the lateral nasal cavity wall or paranasal sinuses include endophytic folded ribbons of peninsular epithelial projections that seem to push or invert into the underlying stroma (Plate 2). Thus the term "inverted" papilloma is commonly used for these lesions.

The convoluted epithelium of these papillomas is thicker than the normal respiratory epithelium, and usually very much so. Although the epithelium often has some columnar cells, particularly near the surface, much of the epithelium has usually developed a squamous or epidermoid quality. Frequently the epithelium is virtually all squamous. It is nonkeratinizing and rather immature squamous epithelium, however; therefore it has a so-called transitional quality. A few mucous cells may be found, attesting to the respiratory mucosal epithelial origin (as opposed to the epidermis of the nasal vestibule) for these tumors. The mucous cells sometimes lead to the formation of scattered microcysts within the papillary epithelium.

The cytoplasm of some of these papillomas may be modest in amount, and the lesions thus will appear moderately cellular. Some mitotic activity may be present away from the basal area, and so the papillomas can appear histologically active. However, nuclei are uniform, as is the polarity of the cells, and this helps to exclude a papillary carcinoma.

Some of these papillomas retain a columnar or cylindrical cell population throughout their epithelium, together with a moderately abundant pink and oncocytoïd granular cytoplasm (Plate 3). This variant of inverted

\*Department of Otolaryngic Pathology, Armed Forces Institute of Pathology, Washington, DC 20306.

papilloma has been called the cylindrical cell papilloma. Intraepithelial microcysts may be prominent.

Approximately 5 to 10% of inverted papillomas (particularly when found in the older patient) develop an associated squamous cell carcinoma. For the exophytic septal papillomas, this malignant transformation seems to be extremely rare.

Benign mixed tumors (pleomorphic adenomas) of salivary gland type can arise in the nasal cavity, usually from the nasal septum. Often the amount of cartilage is scant or even virtually absent, making histologic recognition difficult.

## Malignant Epithelial Tumors

The most common malignancy in the human upper respiratory tract is squamous cell carcinoma. The histologic features of most variants of this type of tumor are well known to all pathologists. The most differentiated indicators are keratinization and intercellular bridges. These carcinomas can, of course, have varied degrees of differentiation (both among tumors in different hosts or within a given individual tumor). When the tumors are poorly differentiated (and without intercellular bridges or evidence of keratin) their recognition or categorization can become difficult.

Many nonkeratinizing squamous cell carcinomas tend to recapitulate the stratified surface epithelium from which they have arisen. They form ribbons of stratified epithelium which, together with a paved appearance of tumor cells, allows for recognition of their squamous nature. Some pathologists have used the terms "transitional" or "transitional cell" carcinoma for this variant.

Some nonkeratinizing squamous cell carcinomas have convoluted ribbons of epithelium growing in a pattern virtually identical to that of an inverted papilloma. Distinction may be difficult and misdiagnosis can be a problem. The carcinomas tend to have cells with, at least, slightly more nuclear variability, increased nuclear to cytoplasmic quantity ratios, and sometimes more mitoses than are found in the papillomas (Plate 4). However, these differences may be small or subtle. In many of the papillary carcinomas, a disturbance in cellular polarity with a somewhat jumbled up appearance of the tumor tissue can be helpful in diagnosis.

Although the respiratory epithelium can give rise to carcinomas with very clear squamous features, some nonkeratinizing respiratory epithelial carcinomas retain a columnar or cylindrical shape in many or most of their cells. These carcinomas have been called cylindrical cell carcinomas. Occasionally there may be some scattered mucus-containing cells or glandlike formations, and a distinction from an adenocarcinoma may be difficult. However, if a good ribbonlike pattern is maintained, these tumors may be more closely related to nonkeratinizing squamous cell carcinomas than to adenocarcinomas.

Squamous cell carcinomas can undergo a remarkable transformation into a poorly differentiated spindle cell proliferation that can be extremely difficult to

distinguish from a sarcoma (particularly a fibrosarcoma or a malignant fibrous histiocytoma). Indeed, the term carcinosarcoma has sometimes been used for these tumors, although they are, histogenetically, carcinomas. If an area of obvious squamous cell carcinoma with an apparent transition into the sarcomatoid component is found, the recognition of the tumor is not too difficult. However, in many tumors, the spindle cell transformation has become so predominant that the squamous carcinomatous portion is extremely scant or is obscured and not found. The sarcomatoid transformation can become so complete that many or all of the spindle cells lose their ultrastructural and immunohistochemical epithelial features (4). This seems to be an instance of biologic transformation becoming so wondrous as to blur the usual, assumed profound, distinction between carcinomas and sarcomas.

In contrast to the extreme alteration found in the spindle cell carcinomas just discussed, verrucous carcinomas have such a very well-differentiated character that their diagnosis as carcinoma is often very difficult. Indeed, since they are thought to have virtually no metastatic potential (unless they undergo a more malignant transformation), they could be thought of as being in the border zone between benign tumors and frankly biologically malignant ones. These verrucous tumors have been considered carcinomas because of their capacity for invasive and destructive growth. However, their distinction from benign irregular hyperkeratotic (verrucoid) lesions is problematic, since they have no cytologic features of malignancy. The diagnosis rests upon clinical or histologic evidence (ideally both) of the destructively invasive growth.

Sinonasal adenocarcinomas include extremely well-differentiated variants that histologically could be considered as adenomas. However, just like very well-differentiated acinar cell tumors of salivary glands (which histologically suggest adenomas but which have been proven to have some metastatic capacity), they are probably best considered to be low-grade adenocarcinomas (5). These tumors are composed mostly of epithelium that is one cell-layer thick and forms varied glandular, papillary, or cystic architectures (Plates 5 and 6). The individual cells may have a somewhat salivary acinar or oncocytoid character, or may be rather non-specific in appearance. Although some of these tumors may be derived from the mucoserous glands of the sinonasal tract, many seem to have developed from the surface epithelium (5).

Higher grade adenocarcinomas may either be moderately well differentiated or poorly differentiated. Roughly one-half of these tumors (5) have a resemblance to adenocarcinomas of the colon. Many have a moderately well-differentiated glandular and slightly papillary pattern composed of a layer of columnar cells with a suggestion of pseudostratification (Plate 7). While not prominently anaplastic, the nuclei are more variable than those of the low-grade adenocarcinomas and many are hyperchromatic. Mitotic figures are usually not hard to find.

Occasionally these adenocarcinomas will produce an overabundance of mucin and will resemble the so-called colloid adenocarcinomas that are sometimes found in the colon. Rarely a signet-ring adenocarcinoma may be found in the sinonasal tract.

Sinonasal adenocarcinomas that resemble colonic carcinomas have a relatively high association with occupational wood dust exposure. While some patients with this type of adenocarcinoma do not have a history of such exposure, and adenocarcinomas with a nonspecific histologic appearance may occasionally occur in a person with significant wood dust exposure, the correlation between wood dust and this particular histologic category of sinonasal adenocarcinoma is rather strong in most studies (6).

Adenoid cystic carcinomas histologically identical to those of salivary gland origin make up a significant proportion of sinonasal glandular tumors. They are very difficult to cure in this anatomic location.

Tumors resembling low-grade mucoepidermoid carcinomas of the salivary type have occurred in the sinonasal area, although they are very uncommon. High-grade and poorly differentiated carcinomas with both squamoid and adenoid features can be found in the upper respiratory areas. Since they arise from the surface mucosal epithelium and are not clearly related to salivary high-grade mucoepidermoid carcinomas, perhaps adenosquamous carcinoma is the most appropriate term for these neoplasms.

Undifferentiated carcinomas are, of course, found in the upper respiratory tract. They may have a nonspecific large cell pattern, or they may be the small cell neuroendocrine or oat cell type (7).

## Benign Soft Tissue Tumors

In addition to occasional hemangiomas, the nasal cavity can give rise to hemangiopericytomas. These tumors are prone to be misdiagnosed as many other types of neoplasia (8). In contrast to hemangiopericytomas in other locations, these sinonasal tumors are seldom histologically or clinically clearly malignant.

Smooth muscle tumors are rare in the upper respiratory tract, possibly because smooth muscle is not present except in vessel walls. This may also account for the fact that, when leiomyomas are found, these tumors often are vascular.

Benign myxomas occur in the sinonasal regions, particularly in young persons. Although benign, they can destroy bone. It is important to distinguish these tumors from the highly malignant embryonal rhabdomyosarcomas of this anatomic region, and immunohistochemistry can be helpful in this regard.

Schwannomas, neurofibromas, and fibrous histiocytomas occurring in the sinonasal tract are histologically similar to such tumors occurring in other anatomic locations.

## Malignant Soft Tissue Tumors

High-grade fibrosarcomas are very uncommon in the sinonasal tract, and most fibrosarcomas of this region are slowly growing tumors of low histologic grade. These tumors are composed of interwoven fascicles of elongated, thin spindle cells (Plate 8). Mitotic figures are rare. Distinction from an aggressive fibromatosis can be difficult, but usually, at least, some areas are more cellular than generally would be expected with fibromatosis.

Some low-grade fibrosarcomatous sinonasal tumors have wavy nuclei and occasional S-100 positive cells. They may represent a low-grade variant of malignant schwannoma. They do not look typical for a cellular benign schwannoma and, unlike the latter, are not encapsulated or well demarcated at their edge. Higher grade sinonasal malignant schwannomas may occasionally occur.

Either sinonasal fibrosarcomas or malignant schwannomas may have an associated marked papillary hyperplasia of the respiratory epithelium. The cause of this is not clear, but the effect may be striking. Sometimes the papillary epithelial proliferation is misinterpreted as an inverted papilloma, and it can be so eye-catching that the actual neoplasm (the sarcoma) is overlooked by the histopathologist.

Sinonasal leiomyosarcomas can be very difficult to distinguish from fibrosarcomas and malignant schwannomas, and immunostrains do not always ensure distinction. Because of this the incidence of these leiomyosarcomas is somewhat uncertain, but they are probably very uncommon.

Rhabdomyosarcoma is an important tumor of the nasal passages and adjacent areas, occurring most often in children. The embryonal type is a spindle cell and frequently myxoid malignancy that sometimes may be misinterpreted as a benign tumor. The alveolar variant is seldom misdiagnosed as benign, but it may be difficult to distinguish from other round cell poorly differentiated malignancies. Immunostains are often helpful in resolving these problems.

Ewing's sarcoma, malignant fibrous histiocytoma, and malignant hemangiopericytoma may occasionally be found in this area. Angiosarcomas also occur, although they are probably very rare, and probably more rare than even the scant reported cases would suggest. Atypical reactive vascular proliferations in this anatomic location can easily be misdiagnosed as angiosarcoma (9).

## Tumors of Bone and Cartilage

Osteomas are not uncommon in the sinonasal tract, particularly in the frontal sinus. Chondromas are less common and may be difficult to distinguish from low-grade chondrosarcomas. Higher grade chondrosarcomas and also osteosarcomas occur in this region.

Fibrous dysplasia and ossifying fibroma are not infrequently encountered in the sinonasal tract. Growth patterns as judged from radiographs are often important in distinguishing these two lesions. Sinonasal giant cell

tumors are occasionally found, and when they are discovered in other locations, hyperparathyroidism must be excluded.

## **Tumors of Lymphoid and Hematopoietic Tissues**

Although Hodgkin's disease would be extremely rare in the sinonasal tract, almost any type of non-Hodgkin's malignant lymphoma may present as an extranodal tumor in this location. Extranodal plasmacytomas are not rare. Burkitt's lymphoma is an important undifferentiated B-cell lymphoma that frequently involves facial bones (especially in African children), although it also can involve other areas.

A diagnostically troublesome, destructive condition that has been referred to as "lethal midline granuloma" is, in reality, a type of malignant lymphoma, probably usually of T-cell type. Other recently popular names for this lymphoma are polymorphic reticulosis and, more to the point, malignant reticulosis. It causes problems in diagnosis, partly because the malignant cells are (at least in the initial stages of the malignancy) scattered among many nonneoplastic inflammatory cells. Most of the malignant cells may be relatively small and unobtrusive.

## **Miscellaneous Tumors**

Odontogenic tumors can occur in the sinonasal tract. Sometimes, for example with an occasional ameloblastoma, the apparent site of origin may be significantly rostral to the odontogenic apparatus.

In contrast to the pharynx, childhood teratomas arising from the sinonasal tract proper are extremely rare. Less rare, but still very uncommon, malignant teratoid tumors in adults have been described (10). Small biopsies from these tumors may be diagnosed as many other types of tumors.

Primary sinonasal malignant melanomas are not extremely uncommon (although they are rare in the pharynx). When examining a poorly differentiated sinonasal malignancy, one should always keep the possibility of melanoma in mind.

Olfactory neuroblastomas are an important tumor type. When this tumor is relatively well differentiated (Plate 9) with a prominent neurofibrillary matrix, it is not too difficult to diagnose. However, less well-differentiated examples can be confused with a multitude of other neoplasms. Distinction from carcinoma can be especially difficult. Even when some differentiation is present, neural rosettes may be interpreted as glands and vice versa. The distinction between these two types of structures can be quite difficult; it is complicated by the finding of keratin-positive epithelial cells and glandlike structures in occasional olfactory neuroblastomas (D. K. Heffner, personal observation). Some of these epithelial cells may be entrapped nonneoplastic cells derived from sinonasal glands (11) or surface epithelium. However, some have been intimately involved in the tumor in a

fashion to suggest that they are part of the neoplastic population (D. K. Heffner, personal observation). Perhaps these epithelial structures are neoplastic representations of the sustentacular cells of the olfactory neuroepithelium from which these tumors derive.

## **Tumorlike Lesions**

Numerous hyperplasias, metaplasias, and reactive-inflammatory conditions must be distinguished from neoplasia ("Appendix"). Particularly important are inflammatory polyps with atypical stromal cells (12) and atypical reactive or organizational vascular proliferations (9).

## **Tumors of the Nasopharynx**

### **Benign Epithelial Tumors**

Papillomas of sinonasal type (i.e., inverted papillomas) do not characteristically arise in the nasopharynx, although occasionally a nasal cavity papilloma may creep onto the nasopharyngeal side of the soft palate. Small oncocyctic proliferations are not rare in the nasopharynx. Since most of these seem to be of quite small size and very limited growth potential, they most likely represent metaplasias with hyperplasia rather than neoplasias.

Although very uncommon, pleomorphic adenomas may be found in the nasopharynx. They should be distinguished from chordomas (a malignant tumor) for which they sometimes can be mistaken.

### **Malignant Epithelial Tumors**

Most nasopharyngeal carcinomas (NPCs) are essentially poorly differentiated variants of squamous cell carcinomas. Only uncommonly do they have such differentiated features as intercellular bridges or keratin production. Although lacking keratin production, many NPCs retain a paved epithelial appearance (13) and ribbonlike architecture that suggests a faint squamous nature.

Many NPCs become quite poorly differentiated or essentially undifferentiated. Although these undifferentiated carcinomas are not always histologically distinguishable from undifferentiated carcinomas arising elsewhere, they often have a somewhat characteristic appearance (14). Groups of cells have a very syncytial cytoplasm, nuclei tend to overlap, nucleoplasm may be quite clear or washed out (even in properly fixed tissue), and nuclei are contrastingly quite prominent (Plate 10). These carcinomas are associated with the presence of the Epstein-Barr virus genome in the tumor cells; conceivably, this association has something to do with the somewhat characteristic histologic features of these neoplasms.

Adenocarcinomas of the nasopharynx are scarce, but the adenoid cystic variant is not rare. Occasionally encountered are low-grade papillary adenocarcinomas that somewhat resemble thyroid carcinomas.

## Soft Tissue Tumors

Among this group of tumors the juvenile nasopharyngeal angiofibroma stands out as a characteristic tumor of the anatomic region. Although it may arise from the extreme posterior position of the upper lateral nasal cavity, it almost always presents with a prominent component in the nasopharynx. Although the histologic findings of benign fibrous tissue and vessels have been considered rather nonspecific, there are subtle aspects of the pattern of the tumor that usually allow for a specific histologic recognition (9).

## Miscellaneous Tumors

Teratomas can arise in the nasopharynx of infants. Tumors of the mid-skull base such as pituitary adenomas, craniopharyngiomas, and meningiomas may be found in the nasopharynx.

## Tumors of the Larynx, Hypopharynx, and Trachea

Many of the tumors discussed above can also occur in these anatomic regions ("Appendix"). Papillomas, associated with the human papilloma virus genome, are the most common benign tumors. Squamous cell carcinomas are relatively common. Poorly differentiated adenosquamous carcinomas are not rare, particularly in the hypopharynx. Spindle cell sarcomatoid carcinomas are not especially rare, and often present as polypoid exophytic masses. Occasionally neuroendocrine carcinomas of the supraglottic larynx are encountered that often contain calcitonin and may be mistaken for metastatic medullary carcinoma of the thyroid.

Among soft tissue tumors, benign granular cell tumors are found, especially in the true vocal cords. Synovial sarcomas can occur in this region.

Among bone tumors, chondrosarcomas (usually low grade) of the laryngeal skeleton deserve mention.

## APPENDIX

## Histologic Classification of Tumors of the Nasal Cavity and Paranasal Sinuses (Excluding Nasal Vestibule)

### Epithelial Tumors

#### Benign

- Schneiderian papilloma
- Inverted
- Exophytic
- Cylindric cell (oncocytic papilloma)
- Pleomorphic adenoma (benign mixed tumor)

#### Malignant

- Squamous cell carcinoma
- Verrucous (squamous) carcinoma
- Spindle cell (squamous) carcinoma
- Cylindric cell carcinoma (transitional, respiratory epithelial, or nonkeratinizing carcinoma)

#### Adenocarcinoma

- Low-grade, very well-differentiated adenocarcinoma
- Oncocytic
- Acinic cell
- Varied miscellaneous patterns
- High-grade adenocarcinoma
- Colonic (mucinous) adenocarcinoma
- Poorly differentiated adenocarcinoma
- Adenoid cystic carcinoma
- Mucoepidermoid carcinoma
- Undifferentiated carcinoma

### Soft Tissue Tumors

#### Benign

- Hemangioma
- Hemangiopericytoma
- Neurofibroma
- Neurilemmoma (schwannoma)
- Myxoma (fibromyxoma)
- Fibrous histiocytoma (fibroxanthoma)
- Leiomyoma
- Angiofibroma (nasopharyngeal type)
- Others

#### Malignant

- Fibrosarcoma
- Malignant schwannoma (neurofibrosarcoma)
- Rhabdomyosarcoma
- Leiomyosarcoma
- Ewing's sarcoma
- Malignant fibrous histiocytoma (malignant fibroxanthoma)
- Malignant hemangiopericytoma
- Angiosarcoma
- Others

## Tumors of Bone and Cartilage

### Benign

Chondroma  
Osteoma  
Ossifying fibroma  
Giant cell tumor  
Others

### Malignant

Chondrosarcoma  
Osteosarcoma  
Others

## Tumors of Lymphoid and Hematopoietic Tissues (Including Malignant Reticulosis or Polymorphic Reticulosis)

### Miscellaneous Tumors

#### Benign

Teratoma  
Meningioma  
Odontogenic tumors  
Melanotic neuroectodermal tumor  
(melanotic prognoma)  
Others

#### Malignant

Malignant melanoma  
Olfactory neurogenic (esthesioneurogenic) tumors  
Teratocarcinosarcoma (malignant teratoma)  
Others

## Secondary Tumors

### Tumorlike Lesions

Pseudoepitheliomatous hyperplasia  
Necrotizing sialometaplasia  
Oncocytic metaplasia and hyperplasia  
Cysts  
Mucocoele  
Granuloma pyogenicum (granulation tissue  
hemangioma)  
Nasal inflammatory polyp  
Fibromatosis  
Tumefactive fibroinflammatory lesion  
Fibrous dysplasia

Giant cell reparative granuloma  
Infective granulomas  
Cholesterol granuloma  
Wegener's granulomatosis  
Nasal glial heterotopia  
Meningo-encephalocele  
Eosinophilic granuloma (Langerhans histiocytosis)  
Myospherulosis  
Extranodal sinus histiocytosis (with massive  
lymphadenopathy)  
Allergic mucin impaction pseudotumor

## Histological Classification of Tumors of the Nasopharynx

### Epithelial Tumors

#### Benign

Squamous cell papilloma  
Oxyphilic adenoma (oncocyoma)  
Pleomorphic adenoma (mixed tumor)  
Others

#### Malignant

Nasopharyngeal carcinoma  
Squamous cell carcinoma (keratinizing  
carcinoma)

Nonkeratinizing carcinoma  
Undifferentiated carcinoma (of nasopharyngeal  
type)  
Adenocarcinoma  
Low-grade papillary adenocarcinoma  
Poorly differentiated adenocarcinoma  
Adenoid cystic carcinoma  
Others

## Soft Tissue Tumors

### Benign

Juvenile angiofibroma  
Neurofibroma  
Neurilemmoma (schwannoma)  
Paranglioma

Hemangioma

Others

### Malignant

Fibrosarcoma  
Rhabdomyosarcoma  
Malignant schwannoma  
Others

## Tumors of Bone and Cartilage

## Tumors of Lymphoid and Hematopoietic Tissues

## Miscellaneous Tumors

### Benign

Teratoma  
Solid  
Cystic (dermoid cyst)  
Pituitary adenoma  
Meningioma

Craniopharyngioma

Others

### Malignant

Malignant melanoma  
Chordoma  
Others

## Secondary Tumors

## Unclassified Tumors

## Tumorlike Lesions

Pseudoepitheliomatous hyperplasia  
Oncocytic metaplasia and hyperplasia  
Cysts  
Pyogenic granuloma  
Fibromatosis

Amyloid deposits  
Infective granulomas  
Benign lymphoid hyperplasia (adenoids)  
Wegener's granulomatosis

## Histological Classification of Tumors of the Larynx, Hypopharynx, and Trachea

## Epithelial Tumors

### Benign

Squamous cell papilloma/papillomatosis  
Oncocytoma  
Pleomorphic adenoma  
Others

### Malignant

Carcinoma *in situ* (intraepithelial carcinoma)  
Squamous cell carcinoma  
Verrucous (squamous) carcinoma  
Spindle cell (squamous) carcinoma

Adenosquamous carcinoma

Adenocarcinoma

Adenoid cystic carcinoma

(Neuro) endocrine carcinomas

Well-differentiated (carcinoid type)

Moderately differentiated (neuroendocrine adenocarcinoma)

Undifferentiated small cell type (oat cell type)

Undifferentiated (large cell) carcinoma

## Soft Tissue Tumors

### Benign

Lipoma  
Hemangioma  
Leiomyoma  
Rhabdomyoma  
Granular cell tumor  
Neurofibroma  
Neurilemmoma (schwannoma)  
Paranglioma  
Fibrous histiocytoma  
Others

### Malignant

Fibrosarcoma  
Synovial sarcoma  
Malignant schwannoma  
Malignant fibrous histiocytoma  
Kaposi's sarcoma  
Angiosarcoma  
Malignant hemangiopericytoma  
Liposarcoma  
Others

## Tumors of Bone and Cartilage

### Benign

Chondroma  
Giant cell tumour  
Others

### Malignant

Chondrosarcoma  
Osteosarcoma  
Others  
Pseudoepitheliomatous hyperplasia  
Verruca vulgaris  
Epithelial abnormalities  
    Keratosis/hyperplasia  
    Dysplasia  
Oncocytic metaplasia and hyperplasia  
Cysts  
    Laryngocele  
    Ductal cysts

Intubation granuloma/contact ulcer  
Vocal cord polyps

    Fibrous  
    Vascular  
    Hyalinized/fibrinous  
    Myxoid  
Amyloid deposits  
Infective granulomas  
Plasma cell granuloma  
Wegener's granulomatosis  
Tracheopathia osteochondroplastica  
Fibroinflammatory pseudotumours  
Ectopic thyroid tissue  
Lipoid proteinosis  
Hamartoma

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PLATE 1. Exophytic papilloma of nasal septal mucosa, demonstrating typical architecture. H&E,  $\times 30$ ; AFIP #83-10292.

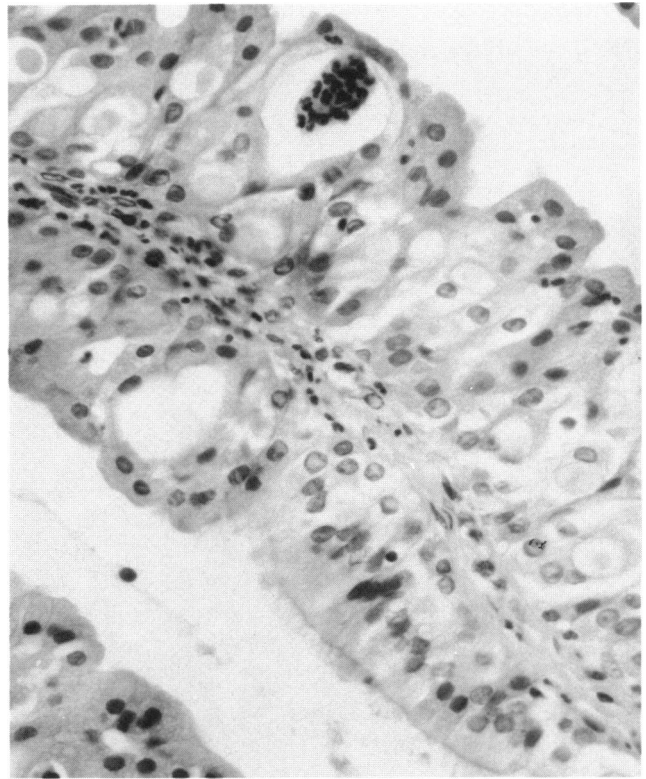


PLATE 3. Cylindrical cell variant of inverted papilloma composed of cells with slightly granular, abundant cytoplasm; microcysts are present. H&E,  $\times 440$ ; AFIP #83-10294.



PLATE 2. Sinonasal inverted papilloma, showing endophytic growth patterns. H&E,  $\times 30$ ; AFIP #83-10279.

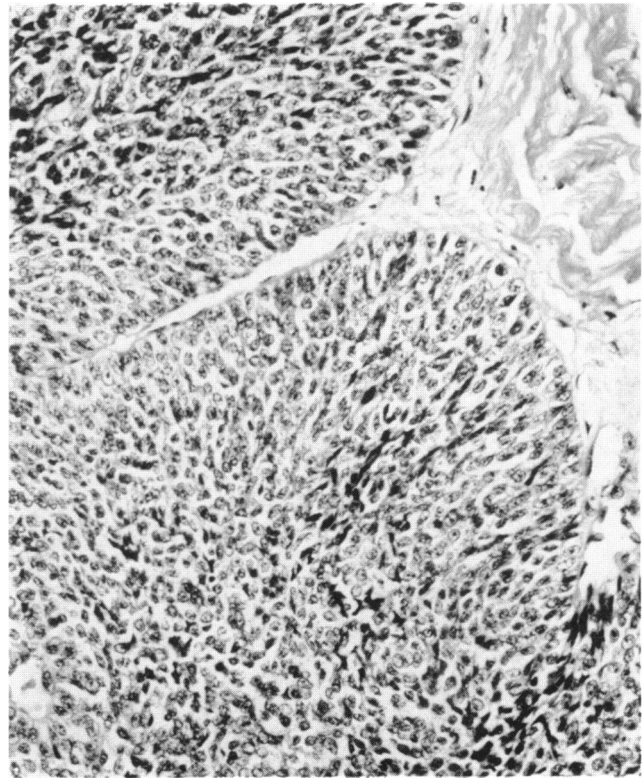


PLATE 4. High power of a nasal cavity papillary transitional carcinoma, showing cellular disorganization and only scant amounts of cytoplasm. H&E  $\times 250$ ; AFIP #83-8239.

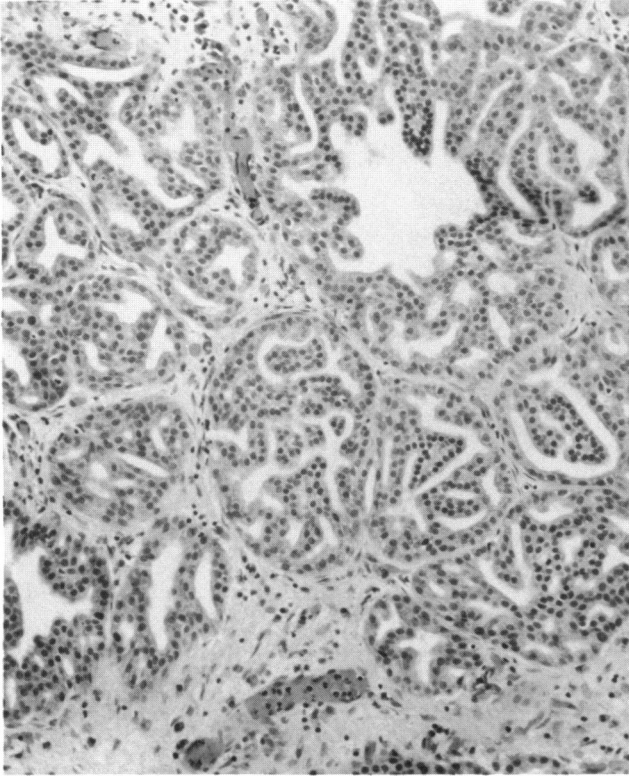


PLATE 5. Low-grade sinonasal adenocarcinoma with moderately complicated glandular architecture. H&E,  $\times 160$ ; AFIP #80-3367.

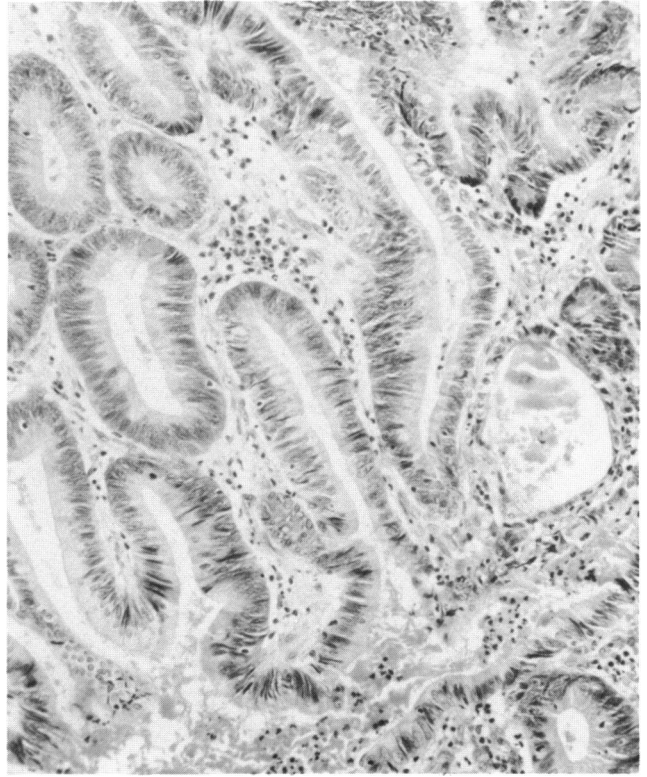


PLATE 7. Sinonasal adenocarcinoma with histologic resemblance to colonic adenocarcinoma. H&E,  $\times 200$ ; AFIP #80-3373.

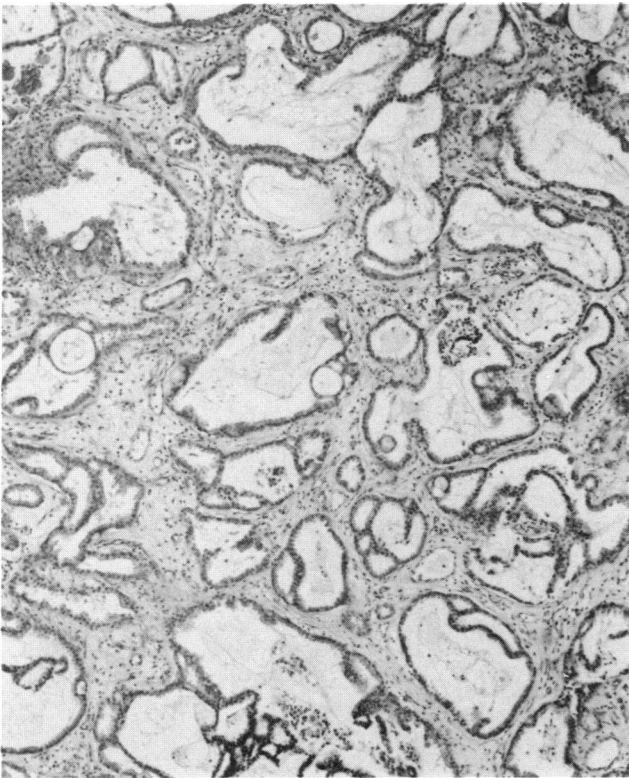


PLATE 6. Low-grade sinonasal adenocarcinoma; a pattern with cystic glandular spaces. H&E,  $\times 60$ ; AFIP #80-3364.

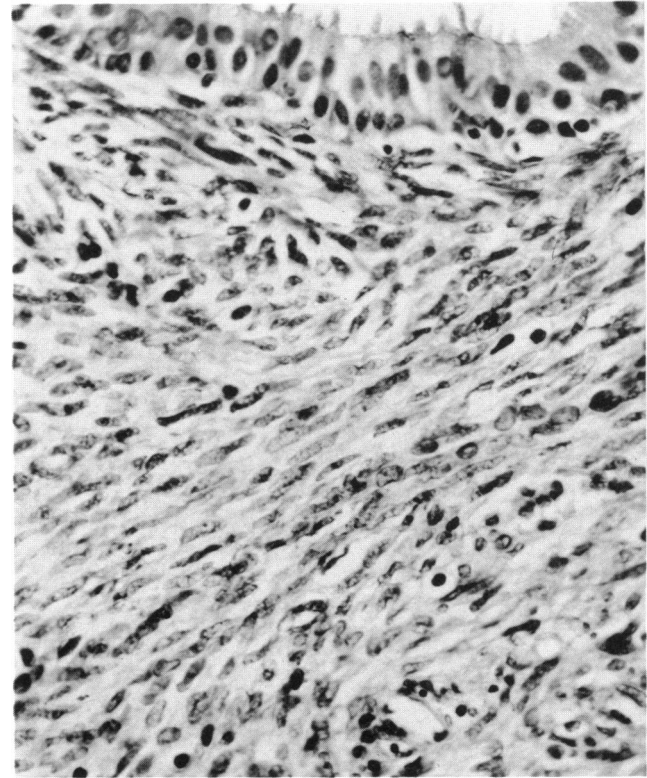


PLATE 8. Low-grade sinonasal fibrosarcoma with fascicles of spindle cells. H&E,  $\times 300$ ; AFIP #-10564.

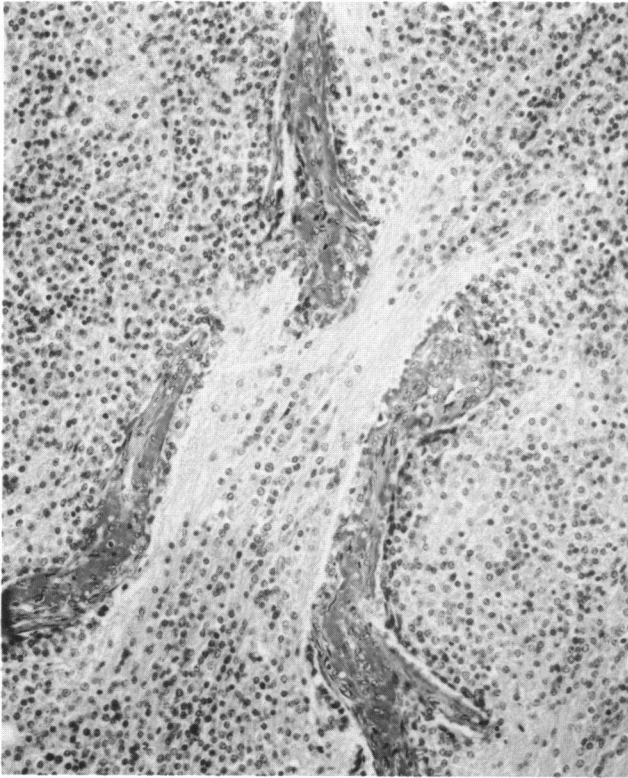


PLATE 9. Olfactory neuroblastoma, manifesting some neurofibrillary matrix near center. H&E,  $\times 160$ ; AFIP #83-5784.

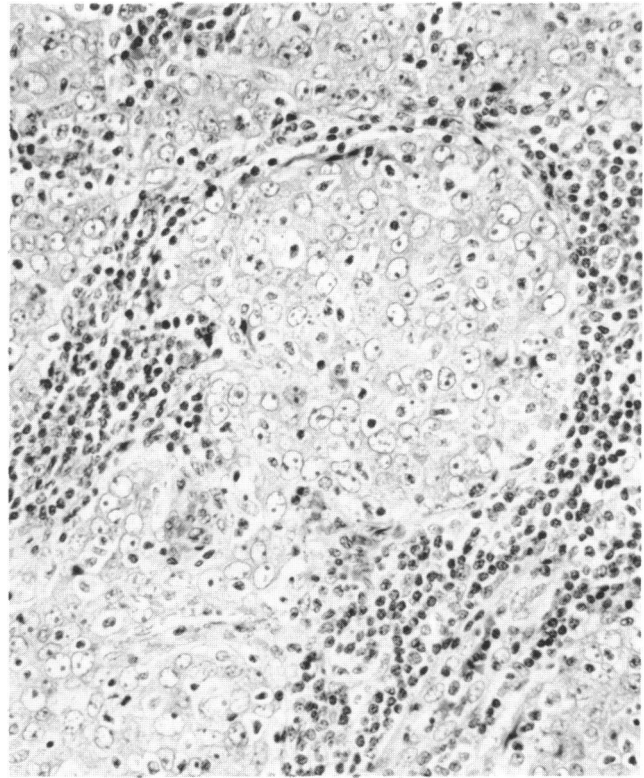


PLATE 10. Nasopharyngeal carcinoma with syncytia of cells with clear nuclei and contrastingly prominent nucleoli. H&E,  $\times 250$ ; AFIP #83-8233.